

PRELIMINARY STUDY ON THE SKIN THICKNESS OF ADULT MALAYAN TAPIR

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SUMMARY

The thickness of skin from nine selected parts of the body of 22 (9 males:13 females) Malayan tapirs (*Tapirus indicus*) was measured and recorded. A 5cm x 5 cm skin samples from the dorsal & lateral neck, lateral facial, medial and lateral foreleg and hind leg, dorso-lateral part of the hindquarter skin (pelvis area) and dorsal back (above last thoracic vertebrae) was obtained and measured using a digital calliper at the precision of ± 0.02 mm. The skin at the dorsal neck is the thickest (21.36 mm) followed by the lateral neck (11.13 mm) and lateral hindleg (10.80 mm), while the lateral facial skin (6.05 mm) is the thinnest followed by the medial hindleg (6.13 mm) and medial foreleg (6.85 mm). The comparison of skin thickness between females and males was statistically not significant. The information gathered from this study may be important for the management of tapir in captivity.

Keywords: Malayan tapir, Tapirus indicus, skin thickness

INTRODUCTION

Tapiridae is a family of four species which include the Malayan tapir (*Tapirus indicus*), Brazilian tapir (*Tapirus terrestris*), Baird's tapir (*Tapirus bairdii*) and Mountain tapir (*Tapirus pinchaque*). Among the four species, the Malayan tapir is the largest and distinguished by its black and white body coloration. The adult has a body weight ranging from 295-430 kg (Quse and Fernandes-Santos, 2014). The females are often larger than the males by 25 kg to 100 kg (Gearty, 2012).

The Malayan tapir is the only tapir species native to Southeast Asia, and they are distributed from the southern part of Myanmar and Thailand, Peninsular Malaysia and the Island of Sumatera, Indonesia (Lynam *et al.*, 2008). The Malayan tapir habitat comprises of swamp peat area to the lowland forest (Brooks, 1997). However, they also reported being seen at an elevated area at 2400 meters above sea level (Holden *et al.*, 2003). The type of habitat where the Malayan tapir lives require a 'tough' body and strong skin to go through the thick and dense forest. The tapirs have thick skin (Pollock and Ramsey, 2003; Lilia *et al.*, 2010), the skin around the neck is between 20-30 mm thick and very hard (Meijaard and Strien, 2003), and this allows them to withstand the thorny and dense bushes. However, at the point of this article written, there are no published reports specifically on the skin thickness of Malayan tapirs. Therefore, this preliminary study was conducted to document the thickness of different parts of the skin of adult Malayan tapir. The information gained from this study could benefit the management of the species in captivity.

MATERIALS AND METHODS

Twenty-two (n=22) dead adult Malayan tapir were involved in this study. All tapirs were roadkill's; died due to traumatic injury due to collision with the vehicle. The skin samples from the dead Malayan tapir were collected within 24 hours after death. A 5 cm X 5 cm skin sample was obtained from different parts of the body as illustrated in Figure 1; dorsal and lateral neck, lateral facial, medial and lateral foreleg and hind leg (just above the hook and knee joint), dorso-lateral part of the hindquarter skin (pelvis area) and dorsal back (above last thoracic vertebrae). The skin sample was incised using a sharp scalpel blade. The subcutaneous or muscle tissues attached to the skin were removed before measurement. The skin samples were either directly measured or chilled (5°C) until measured. A digital calliper (Absolute™, Mitutoyo Corp., Japan) with a precision of ± 0.02 mm was used to measure the thickness of each skin sample. All collected data were documented in Microsoft Excel, and the comparison of skin thickness between female and male were analysed using IBM™ SPSS (Version 26).

RESULTS AND DISCUSSION

The overall average skin thickness of different parts of the body of 22 adult Malayan tapirs was shown in Table 1. The skin at the dorsal neck was the thickest (21.36 mm) followed by the lateral neck (11.13 mm) and lateral hindleg (10.80 mm). The skin structure at these parts was denser and less flexible. Meanwhile, the thinnest part of the tapir skin was at the lateral facial skin (6.05 mm) followed by the medial hindleg (6.13 mm) and medial foreleg (6.85 mm). The skin at this part was softer and more flexible. The Mann Whitney U test revealed no significant difference in skin thickness between the female and male Malayan tapir ($P > 0.05$).

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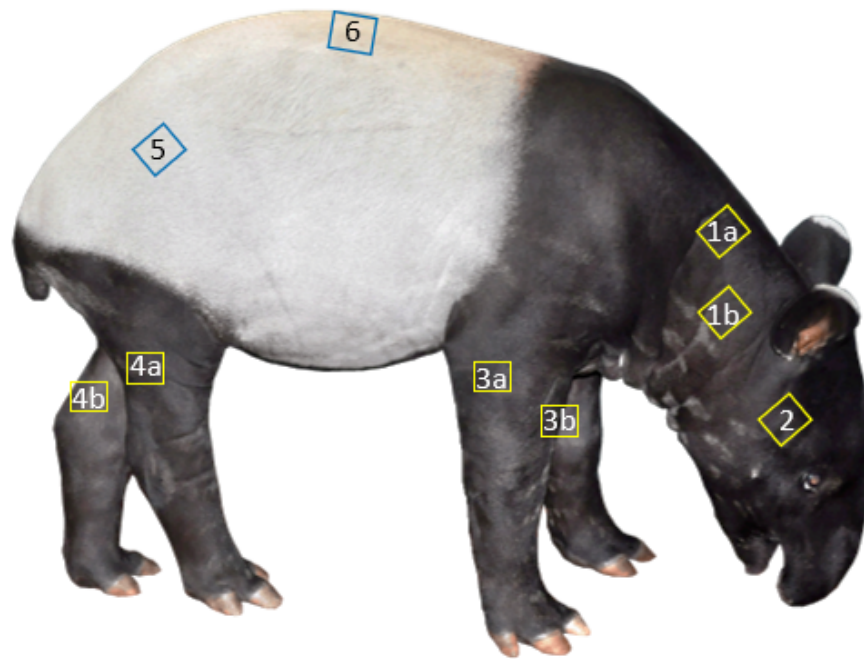


Figure 1. Skin sampling at dorsal neck (1a), lateral neck (1b), lateral facial (2), lateral foreleg (3a), medial foreleg (3b), lateral hindleg (4a), medial hind leg (4b), dorso-lateral part of the hindquarter (pelvis) (5) and dorsal back (6).

In general, skin is the outer tissue covering the body of a vertebrate animal that is made up of three layers, the epidermis, dermis and hypodermis with three main functions: protection, regulation, and sensation (Yousef *et al.*, 2017). In Malayan tapir, except for the toes (hoof) and eyes, the skin covers the whole body. The skin of the dorsal and lateral parts of the body is thick and hard. Meanwhile, the skin at the inguinal area, medial part of both limbs and ventral parts of the abdomen and thoracic area are thinner, more elastic and softer. Although the female Malayan tapir is heavier than the male, there are no significant differences in skin thickness between male and female.

In this study, the overall average skin thickness of the different parts of the body of Malayan tapirs is 10.12 mm. This is indeed considerably thicker than the skin of horses, 1.2 mm to 7 mm (Wakuri *et al.*, 1995). In the wild habitat, the thick skin protects when the Malayan tapir moves through the dense undergrowth (Lekagul & McNeely, 1988). Meanwhile, Sanborn and Watkins (1950), presumed that the thick skin of the dorsal and lateral part of the neck is for protection from predator bites. Although no published report of wild Malayan tapirs being prey of predators, the Malayan tapirs could still become the victim of predators such as tigers and panthers. This study confirmed that the skin at the dorsal part of the neck is the thickest as the average thickness is 21.36 mm. Thus, it may give added protection as it is presumably the skin is not easily torn by the predator bite. However, the thick skin may impede detection of early lesions under the skin, such as accumulation of pus or other body fluid, because

changes may not be observable at the affected area during a physical examination and delay treatment.

The neck region is the best area to deliver drugs intramuscularly for sedation. Therefore, at least an inch 18G needle is needed to deliver the drugs intramuscularly. Although intramuscular administration could also be done at the gluteus muscle, the tapir is sensitive when medication is administered at this region may be due to pain when pierced with a needle. Meanwhile, due to the thickness and stiffness of the skin, subcutaneous fluid or medication could not be given through most of the body parts. The best area to give subcutaneous fluid or medication is at the ventral area of the body especially at the skin flap between the ventral abdomen and limbs but with a limited amount. In addition, the findings indicated the most suitable site for microchip implantation under the skin, which is behind the ears, as the skin at this area is not too thick and has less risk of microchips migration. The information on the skin is also important for the veterinarian especially during a surgical procedure as the thickness information may help the surgeon to decide on the suture type and size. Furthermore, diagnostic test such as tuberculin skin test can be decided to be conducted at the most appropriate part of the body.

The information gathered from this study could improve the health and husbandry management of this species in captivity. However, this is only primary work; therefore, further study involving more samples should be done. It is also recommended to add histological analysis of skin from different body parts in future study.

Table 1. The skin thickness from nine parts of the female and male Malayan tapir’s body

Female									
Tapir No.	Skin measurement (mm)								
	Dorsal neck	Lateral Neck	Lateral Facial	Lateral Foreleg	Medial foreleg	Lateral hindleg	Medial hindleg	Pelvis	Dorsal back
1	17.00	8.00	6.50	NT	6.00	7.00	10.50	6.00	9.00
2	28.56	14.55	7.41	NT	6.49	NT	5.09	8.30	11.55
3	25.71	10.80	7.50	NT	6.40	NT	5.51	8.58	9.25
4	20.50	NT	3.74	8.30	5.61	8.66	6.11	6.40	NT
5	22.30	NT	7.20	10.39	6.18	10.55	5.54	8.26	NT
6	25.02	13.34	NT	NT	NT	13.06	NT	11.14	10.48
7	21.40	9.40	5.70	11.00	8.70	11.40	4.00	7.70	10.40
8	23.77	10.17	5.38	NT	4.86	12.00	4.53	8.14	NT
9	20.57	9.18	6.60	NT	6.44	10.83	5.67	9.23	NT
10	19.90	10.35	5.86	7.06	6.74	7.39	4.90	9.81	14.20
11	22.14	NT	7.90	10.80	6.32	10.90	NT	7.14	10.71
12	19.00	9.60	5.60	10.30	9.00	10.00	7.30	7.60	9.00
13	22.00	14.30	7.30	11.67	6.67	12.00	6.30	10.30	9.60
No of cases	13	10	12	7	12	11	11	13	9
Average	22.14	10.97	6.39	9.93	6.62	10.34	5.95	8.35	10.47

Male

Male									
No.	Skin measurement (mm)								
	Dorsal neck	Lateral Neck	Lateral Facial	Lateral Foreleg	Medial foreleg	Lateral hindleg	Medial hindleg	Pelvis	Dorsal back
14	24.84	11.87	4.41	NT	9.50	NT	7.43	7.35	10.27
15	20.62	8.15	7.06	NT	7.67	NT	9.11	7.62	8.44
16	NT	11.70	6.04	NT	6.12	11.66	5.52	NT	11.20
17	14.90	11.60	6.40	11.70	6.50	10.20	7.60	8.20	8.40
18	22.33	9.51	4.84	10.52	8.25	10.86	7.67	8.64	8.82
19	19.87	10.59	5.62	10.08	NT	10.48	3.44	6.69	NT
20	22.14	12.98	5.79	8.23	4.32	NT	4.12	11.75	NT
21	20.60	12.30	5.00	11.00	5.30	12.00	3.60	11.00	10.60
22	19.33	13.00	6.30	10.60	9.00	12.33	8.33	11.00	8.33
No of case	8	9	9	6	8	6	9	8	7
Average	20.58	11.30	5.72	10.36	7.08	11.26	6.31	9.03	9.44

Overall average (Male & female)	21.36	11.13	6.05	10.14	6.85	10.80	6.13	8.69	9.95
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Note: NT = not taken

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CONFLICT OF INTEREST

No conflict of interest to declare.

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